SCE3310C

Mr. Brown

February 11, 2012 855 8634

Chapter 12 Summary

Classification and Composition of Living Things

Classification of Living Things

* + All organisms are grouped into kingdoms
    - Plantae, Animalia, Protista, Monera, Fungi, viruses
  + Kingdoms are divided into phyla
  + Phlya are divided into classes
    - Given Latin or Latinized names
  + Classes are divided into orders
  + Orders are divided into families
  + Families are divided into genus
  + Genus are divided into species
    - First letter of name is always capitalized
    - Whole name italicized
  + Species are divided into varieties
    - Always lowercase
    - Whole name italicized

Composition and Life Processes of Organisms

* All organisms have a life cycle
* The basic unit of structure and function for all organisms is the cell
* Cells are of two types, depending on their internal organization
* All cells have a plasma membrane to protect from the outside
* Some cells have a cell wall
* A eukaryote cell is controlled by the nucleus
* Cytoplasm is the fluid part of the cell outside the nucleus and inside the cell membrane
* The fluid part of the nucleus is the nucleoplasm
* Not all cells are alike
* Specialized cells that work together to perform a specific function is a tissue
* A group of tissues working together is an organ
* A group of organs that work together is an organ system
* Cells exhibit the characteristic activities of life, called life processes
* Cellular respiration is the breakdown of molecules of food to release energy used for building new cells
* Digestion is the mechanical and biochemical breakdown of food in order for the body to absorb
* Excretion is the process of eliminating waste products at the cellular level
* Motion is the process of movement
* Reproduction is the process of creating new individuals from existing ones
* The cell cycle consists of two steps
* Mitosis involves four phases
* Sexual reproduction involves the union of two cells to create a new individual
* Mitotic cell division is the process by which multi-cellular organisms increase their number of cells for growth, healing, and maintenance

The Plant Kingdom

* Scientifically called Plantae or Metaphytae Kingdom
* Divided into as many as 10 phyla
  + Bryophyta (mosses and liverworts)
  + Psilophyta (whisk ferns)
  + Lycophyta (club mosses)
  + Sphenophyta (horsetails)
  + Pterophyta (ferns)
  + Cycadophyta (cydads)
  + Gnetophyta (certain highly specialized trees, shrubs, and climbing vines)
  + Ginkgophyta (only the *Ginko biloba*)
  + Coniferophyta (conifers)
  + Anthopyta (flowering plants)
* Members are autotrophic
* Divided into bryphytes and tracheophytes

The Bryophytes

* Bryophytes are members of the plant phymum bryophta
  + Have simple leaves
  + Do not produce flowers, fruits, or seeds
  + Reproduce sexually and asexually
  + Small, found all over the world, on land but in damp, fresh water areas
  + Liverworts are flat with broader leaves
  + Moss is often associated with plants that have no affiliation with the bryophyta phylum
  + Moss plant cells are capable of retaining large amounts of water
  + Play an important role in soil formation
  + Special interest of botanists, cellular biologists, and geneticists

The Tracheophytes

* Tracheophytes are plants that contain vascular tissue in their roots, stems, and leaves
  + Have vascular tissue that is a continuous system of tubes running through the plant
  + Most are autotrophic, have chlorophyll and are green
  + Divided into those who have seeds and those that do not
  + The plant we see are familiar with is the sporophyte generation (diploid)
  + Includes all trees, shrubs, crop plants, flowers, and grasses
  + Angiosperms have seed covering
    - Produce flowers that form fruits
    - All garden and wild flowers, plants that produce crops, grasses, cereal grains, and trees and shrubs that lose their leaves
  + Gymnosperms have no seed covering (conifer)
  + Evolutionarily, gymnosperms are older seed plants than angiosperms
  + Major organs of a flowering seed plant include the root, stem, leaves, and flowers

Ferns, Horsetails, and Club Mosses

* Nature of Ferns, Horsetails, and Club Mosses
  + Vascular without seeds
  + Range from small moss-sized plants to trees
  + Have true roots, stems, and leaves, they do not produce fruit, seeds, or flowers
  + Mostly land plants
  + Grow best in cool, damp, shaded places
  + All have chlorophyll, are green, and autotrophic
  + First appeared about 350 million years ago
* Ferns
  + numerous millions of years ago, forming large forests
  + stems are underground, growing horizontally ( rhizomes)
  + in most, the leaves (fronds) are the only plant part to appear above ground
  + go through a reproductive cycle, having a spore stage and a sexual stage
  + ferns can also reproduce asexually
* Horsetails and Club Mosses
  + Similar to ferns, especially in reproduction
  + Present millions of years ago
  + Have horizontal stems and upright branches grow from these stems
  + Club mosses are small, low-growing evergreen plants

Roots

* Definition and Types
  + Part of the plant that anchors it by growing downward and outward in the ground
  + Two main kinds of systems are the taproot system and the diffuse root system
  + Some plants’ roots grow from the stems or leaves and are called adventitious roots
* Structure and Growth
  + At the tip is to root cap, which protects the delicate end of the roots and contains most cells
  + Root hairs are tiny, delicate parts of the root that are a short distance behind the tip of the root
  + Length varies depending on the species of plant and the environmental conditions
  + Roots do not necessarily grow down
  + Roots grow towards water
* Function
  + Help anchor the plant
  + Root hair give off an acid that helps dissolve mineral in the soil and absorb needed resources
  + Water and minerals absorbed by root hairs are sent through the roots to the stem and leaves
  + Roots are specialized to their environmental conditions
  + Some plants have fleshy toots in which to store food
  + Some roots can produce new plants asexually
  + Humans use roots as food, medicine, seasoning, and making dye

Stems

* Definition and Kinds
  + Stem is the part of the plant located between the roots and leaves
  + Some are woody, others are weedy
  + Four main groups of aerial stems
    - Shortened stems
    - Creeping stems
    - Climbing stems
    - Erect stems
  + Stems that grow below ground are underground stems
    - Rhizomes
    - Tubers
    - Bulb
    - Corm
* Structure and Growth
  + Bare winter branch of a tree is an excellent example of a woody stem
  + Four distinct regions are located inside the branch of a woody tree
    - Bark
    - Cambium
    - Wood
    - Pith
* Function
  + Provide support
  + Conduct water and dissolved minerals throughout the plant
  + Produces and displays the leaves to receive sunlight
  + Some can manufacture food
  + Some store food
  + Some can grow new plants
  + Some have adaptations to help protect the plant
* Human Uses
  + Food source
  + Make rubber
  + Make linen
  + Medicine
  + Ropes and string
  + Make dyes
  + Used in paints and varnish
  + Used for heating and cooking
  + Lumber

Leaves

* Structure
  + Parts are blade, petiole, and leaf veins
  + Main patterns in which leaf veins are arranged
    - Palmate
    - Pinnate
    - Parallel
  + Leaves have different kinds of edges
* Function
  + To make food for the plant, resulting in the important by-product of oxygen
  + Transpiration
  + Helps plant digest food and change the food into the energy it needs to grow and survive
  + Helps plants remove waste materials
* Some leaves change color
  + When colder weather occurs, plants may lose their chlorophyll, resulting in change of pigments
* Human use
  + Food, beverage, and spice source
  + Shelter
  + Medicine

Flowers

* Definition and Structure
  + Produces new plants by sexual reproduction
  + Large flattened part of the stalk that hold the flower is the receptacle
  + Most flowers have 4 kinds of organs
    - Sepals
    - Petal
    - Stamen
    - Pistil
  + There is a wide variety of shapes, sizes, colors, and configuration
    - Often used to help indentify
  + Monocotyledon and decotyledon flowers are different from each other
* Pollination and Fertilization
  + For seeds to form, pollen from the anther of a stamen must be carried to the sticky stigma of the pistil; this is called pollination
  + When the pollen is carried from the anther of one flower on plant to the stigma of another plant’s flower, this is called crosspollination
  + The control of pollination by humans is called selective breeding
  + When a grain of pollen from the right kind of flower falls on the stigma, it starts to from a pollen tube, which extends down the stigma and the style into the ovary
* Human Use
  + Decoration
  + Food, dyes, perfumes
  + Seasoning or spices
  + Medicine

Fruits and Seeds

* Definition and Function of Fruits
  + Ripened ovary of the flower
  + Part of plant that contains seeds
  + Two main functions
    - Protect the seed inside
    - Help scatter or disperse seeds
  + Classified into two main groups
    - Fleshy and dry
  + In a drupe, the ovary wall ripens into two layers
    - Outer layer becomes soft and flashy
    - Inner layer becomes hard and contains seeds
  + In a berry, the whole ovary becomes fleshy
  + Dry fruits are dehiscent or indehiscent
    - Dehiscent are further divided into pod and capsule
    - Indehiscent do not split open when they are ripe
* Definition and Structure of Seed
  + Matured ovule whose egg cells have been fertilized by sperm cells from pollen grains
  + Typically have three parts (seed coat, stored food, embryo)
  + Several conditions must be present to develop a new plant
    - Water
    - Correct temperature
    - Oxygen
    - Do not need sunlight
  + Seedlings grow best when scattered away from the parent
  + Some fruits scatter their own seeds
  + Many plants depend on the wind to scatter seeds
  + Some seeds are carried away by water
  + Birds and other animals scatter seeds
* Human Use
  + Food source
  + Make oil and cloth
  + Make soap, candles, butter, milk
* Fruits without Seeds
  + Some fruits develop from the flower without forming seeds
  + Fruit growers produce seedless crops
  + Through selective breeding, plant geneticists are trying to improve the kinds of fruit we eat

Caring for Earth’s Plants

* Understanding the Conditions Necessary for Plant Growth
  + Oxygen
  + Water
  + Proper environmental conditions
  + Sunlight
  + Proper soil and minerals
  + Pruning, cutting, and trimming of dead or dying branches helps keep plants health
  + Proper climate for specific plant
* Preserving Earth’s Precious Forests and Wildflowers
  + It is estimated the earth has lost one half of its original acreage of rainforests, and the US alone has lost ¾ or its forests
    - Lumber companies are managing trees more responsibly
    - US Forest Service controls forest fires, lumbering practices, and finds ways to control harmful bugs
    - Education and awareness
    - Global organization are trying to stop the removal of rainforests
    - States protect wildflowers
    - Individuals and organizations protect endangered species